

What is claimed is:

1. A stage assembly that moves a device, the stage assembly comprising:

a device table that retains the device;

5 a stage mover assembly connected to the device table, the stage mover assembly moves the device table;

a measurement system for monitoring the position the device table, the measurement system including a first X mirror and a second X mirror that are secured to the device table;

10 a first fiducial mark and a second fiducial mark that are secured to the device table, the fiducial marks being used to determine the position of the first X mirror relative to the second X mirror.

2. The stage assembly of claim 1 wherein the measurement system includes a first X block that interacts with the first X mirror to monitor the position of  
15 the device table.

3. The stage assembly of claim 2 wherein the first X block interacts with the first X mirror to monitor the position of the device table when the device table is in an alignment position.

4. The stage assembly of claim 3 wherein the measurement system  
20 includes a second X block that interacts with the second X mirror to monitor the position of the device table.

5. The stage assembly of claim 4 wherein the second X block interacts with the second X mirror to monitor the position of the device table when the device table is in an operational position.

6. The stage assembly of claim 1 further comprising a control system that utilizes the first fiducial mark and the second fiducial mark to determine the position of the first X mirror relative to the second X mirror.

7. The stage assembly of claim 6 wherein the measurement system  
5 measures (i) the position of the first fiducial mark relative to the first X mirror and the second X mirror, and (ii) the position of the second fiducial mark relative to the first X mirror and the second X mirror.

Sub. 10 8. The stage assembly of claim 7 wherein control system utilizes the measured position of the first fiducial mark relative to the first X mirror and the second X mirror, and the measured position of the second fiducial mark relative to the first X mirror and the second X mirror to determine the position of the first X mirror relative to the second X mirror.

15 9. The stage assembly of claim 1 including a third fiducial mark secured to the device table, the third fiducial mark also being used to determine the position of the first X mirror relative to the second X mirror.

10. The stage assembly of claim 9 further comprising a control system that utilizes the first fiducial mark, the second fiducial mark and the third fiducial mark to determine the position of the first X mirror relative to the second X mirror.

20 11. The stage assembly of claim 10 wherein the measurement system measures (i) the position of the first fiducial mark relative to the first X mirror and the second X mirror, (ii) the position of the second fiducial mark relative to the first X mirror and the second X mirror, and (iii) the position of the third fiducial mark relative to the first X mirror and the second X mirror.

12. The stage assembly of claim 11 wherein control system utilizes (i) the measured position of the first fiducial mark relative to the first X mirror and the second X mirror, (ii) the measured position of the second fiducial mark relative to the first X mirror and the second X mirror, and (iii) the measured position of the third fiducial mark relative to the first X mirror and the second X mirror to determine the position of the first X mirror relative to the second X mirror.

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SUM B2

13. An exposure apparatus including the stage assembly of claim 1.

14. A device manufactured with the exposure apparatus according to claim 13.

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15. A wafer on which an image has been formed by the exposure apparatus of claim 13.

16. A method for determining the relative positions of a first X mirror and a second X mirror that are secured to a device table, the method comprising the steps of:

15       securing a first fiducial mark and a second fiducial mark to the device table; and

          determining the position of the first X mirror relative to the second X mirror using the first fiducial mark and the second fiducial mark.

17. The method of claim 16 including the step of providing a first X block that interacts with the first X mirror to monitor the position of the device table in an alignment position.

18. The method of claim 17 including the step of providing a second X block that interacts with the second X mirror to monitor the position of the device table in an operational position.

19. The method of claim 16 wherein the step of determining the position includes the step of measuring (i) the position of the first fiducial mark relative to the first X mirror and the second X mirror, and (ii) the position of the second fiducial mark relative to the first X mirror and the second X mirror.

5 20. The method of claim 19 wherein the step of determining the position of the first X mirror relative to the second X mirror includes utilizing the measured position of the first fiducial mark relative to the first X mirror and the second X mirror, and the measured position of the second fiducial mark relative to the first X mirror and the second X mirror to determine the relative position of X mirrors.

10 21. The method of claim 16 including the step of securing a third fiducial mark to the device table, the third fiducial mark also being used to determine the position of the first X mirror relative to the second X mirror.

15 22. The method of claim 21 wherein the step of determining the position includes the step of measuring (i) the position of the first fiducial mark relative to the first X mirror and the second X mirror, (ii) the position of the second fiducial mark relative to the first X mirror and the second X mirror, and (iii) the position of the third fiducial mark relative to the first X mirror and the second X mirror.

20 23. The method of claim 22 wherein the step of determining the position of the first X mirror relative to the second X mirror includes utilizing the measured position of the first fiducial mark relative to the first X mirror and the second X mirror, the measured position of the second fiducial mark relative to the first X mirror and the second X mirror, and the measured position of the third fiducial mark relative to the first X mirror and the second X mirror to determine the relative position of the X mirrors.

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24. A method for making a stage assembly that moves a device, the method comprising the steps of:

retaining the device with a device table;

connecting a stage mover assembly to the device table, the stage mover assembly moving the device table;

monitoring the position the device table with a measurement system, the measurement system including a first X mirror, a second X mirror, and a Y mirror that are secured to the device table;

securing a first fiducial mark and a second fiducial mark to the device table; and

determining the position of the first X mirror relative to the second X mirror using the first fiducial mark and the second fiducial mark.

25. The method of claim 24 wherein the step of determining the position includes the step of measuring (i) the position of the first fiducial mark relative to the first X mirror, the second X mirror, and the Y mirror, and (ii) the position of the second fiducial mark relative to the first X mirror, the second X mirror, and the Y mirror.

26. The method of claim 25 wherein the step of determining the position of the first X mirror relative to the second X mirror includes utilizing the measured position of the first fiducial mark relative to the first X mirror, the second X mirror, and the Y mirror, and the measured position of the second fiducial mark relative to the first X mirror, the second X mirror, and the Y mirror.

27. The method of claim 24 including the step of securing a third fiducial mark to the device table, the third fiducial mark also being used to determine the position of the first X mirror relative to the second X mirror.

Sub B3 5 28. The method of claim 27 wherein the step of determining the position includes the step of measuring (i) the position of the first fiducial mark relative to the first X mirror, the second X mirror, and the Y mirror, (ii) the position of the second fiducial mark relative to the first X mirror, the second X mirror, and the Y mirror, and (iii) the position of the third fiducial mark relative to the first X mirror, the second X mirror, and the Y mirror.

10 29. The method of claim 28 wherein the step of determining the position of the first X mirror relative to the second X mirror includes utilizing the measured position of the first fiducial mark relative to the first X mirror, the second X mirror, and the Y mirror, the measured position of the second fiducial mark relative to the first X mirror, the second X mirror, and the Y mirror, and the measured position of the third fiducial mark relative to the first X mirror, the second X mirror, and the Y mirror.

15 30. A method for making an exposure apparatus that forms an image on a wafer, the method comprising the steps of:

providing an irradiation apparatus that irradiates the wafer with radiation to form the image on the wafer; and

providing the stage assembly made by the method of claim 24.

31. A method of making a wafer utilizing the exposure apparatus made by the method of claim 30.

Sub B4 20 32. A method of making a device including at least the exposure process: wherein the exposure process utilizes the exposure apparatus made by the method of claim 30.